

Nestoriuc Y, Martin A et al. Biofeedback Treatment for Headache Disorders: A Comprehensive Efficacy Review. *Appl Psychophysiol Biofeedback* 2008;33:125-140.

This study presents results of a meta-analysis of the effect of biofeedback on migraine headache and also on tension headache. Some criteria for a good meta-analysis are met (search of multiple databases with search terms specified), there is insufficient information to allow for clear interpretation of the reported results. Figure 1 and Figure 2 report weighted effect sizes for the different forms of biofeedback in the treatment of headache, but these are not forest plots in which the separate studies are presented and in which the reader can discover which studies were included in the analysis. Both figures present only the numbers of studies which were used to calculate the pooled effect sizes (e.g. $k=7$ for EMG biofeedback on migraine in Figure 1), but this does not report which seven studies were included in the analysis.

It appears that study inclusion criteria required only that there be sufficient statistical data to allow the calculation of effect sizes, provided that the studies had at least 4 patients in each treatment arm or case series. Thus, studies of widely varying designs and risk of bias could be combined in each pooled estimate of effect size.

In addition, the estimation of publication bias uses a method (fail-safe N) which has been generally abandoned due to its using methods of combining p-values across studies (a common practice in 1979 when it was proposed) rather than combining effect sizes, as is current practice.

The journal web site did not provide links to any appendix or supplementary tables which would fill in the missing forest plots.

The meta-analysis is inadequate for supporting evidence regarding the effectiveness of any included biofeedback form on either migraine or tension headache.

Nestoriuc Y, Rief W, Martin A. Meta-Analysis of Biofeedback for Tension-Type Headache: Efficacy, Specificity, and Treatment Moderators. *J Counseling Clinical Psychology* 2008;76(3):379-396.

The same authors published a similar meta-analysis separately in the same year, with similar problems in interpretation. Unlike the first analysis, this article has a Table 1 which presents information on effect sizes, but Table 2, similar to Figures 1 and 2 in the first article, present only pooled effect sizes without information as to which studies were combined to estimate the mean effect. Publication bias is addressed again by the now outdated fail-safe N, but in addition, Figure 2 has graphical analysis of publication bias. These can be difficult to interpret, but Figure 1a has a funnel plot with only one study with more than 40 patients, and its effect size is small; using it as a reference point, it appears that the funnel plot may be asymmetrical, suggesting that positive studies are

over-represented in the included studies. That study appears to be Reich 1989, found in Table 1; this study had 78 patients, and has a small effect size whose confidence interval includes the null value of no treatment effect.

Randomized and nonrandomized studies appear to have been combined.

As with the first article, the journal web site did not have a link to supplementary material which would allow the reader to determine which studies were combined for any given treatment effect.

The meta-analysis is inadequate for supporting evidence regarding the effectiveness of any included biofeedback form on either migraine or tension headache.